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--CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application serial number 09/020,205, now U.S. Patent No. 6,123,731.--

IN THE CLAIMS:

Please amend Claim 1 as follows:

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1. (Twice Amended) An osteoimplant which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through chemical linkages between their surface-exposed collagen, provided, that where substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, and wherein the solid aggregate of bone-derived elements possesses a compression strength of from about 10 to about 200 MPa.

Please add new claims 95-134 as follows:

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95. (New) An osteoimplant which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through chemical linkages between their surface-exposed collagen, provided, that where

substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, wherein the bone-derived elements are superficially demineralized or substantially fully demineralized sheets obtained by longitudinally slicing the diaphyseal region of whole cortical bone, and wherein the chemical linkages are formed by exposing the bone-derived elements to a chemical crosslinking agent.

96. (New) The osteoimplant of Claim 95 wherein each sheet is approximately 1.5 mm thick.

97. (New) The osteoimplant of Claim 95 wherein the sheets are assembled into a layered structure prior to exposing the sheets to a chemical crosslinking agent.

98. (New) The osteoimplant of Claim 95 wherein at least one of the sheets possesses a fully or partially demineralized outer surface and a nondemineralized or partially demineralized core.

99. (New) The osteoimplant of Claim 95 wherein at least one of the sheets is fully demineralized.

100. (New) The osteoimplant of Claim 95 wherein at least one of the sheets is coated with demineralized bone powder.

101. (New) The osteoimplant of Claim 97 possessing a total thickness of from about 2 to about 20 mm.

102. (New) The osteoimplant of Claim 95 configured and dimensioned as a square or rectangle.

103. (New) The osteoimplant of Claim 95 configured and dimensioned as a cylinder.

104. (New) The osteoimplant of Claim 95 configured and dimensioned as an intervertebral insert, a long bone, a cranial bone, a bone of the pelvis, a bone of the hand, a bone of the foot or section of any of the foregoing.

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105. (New) An osteoimplant which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through chemical linkages between their surface-exposed collagen, provided, that where substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, wherein the bone-derived elements are sheets obtained by longitudinally slicing the diaphyseal region of whole cortical bone, and wherein the chemical linkages are formed by application of energy.

106. (New) The osteoimplant of Claim 105 wherein each sheet is approximately 1.5 mm thick.

107. (New) The osteoimplant of Claim 105 wherein the sheets are assembled into a layered structure prior to applying energy to the sheets.

108. (New) The osteoimplant of Claim 105 wherein at least one of the sheets possesses a fully or partially demineralized outer surface and a nondemineralized or partially demineralized core.

109. (New) The osteoimplant of Claim 105 wherein at least one of the sheets is fully demineralized.

110. (New) The osteoimplant of Claim 105 wherein at least one of the sheets is coated with demineralized bone powder.

111. (New) The osteoimplant of Claim 107 possessing a total thickness of from about 2 to about 20 mm.

112. (New) The osteoimplant of Claim 105 configured and dimensioned as a square or rectangle.

113. (New) The osteoimplant of Claim 105 configured and dimensioned as a cylinder.

114. (New) The osteoimplant of Claim 105 configured and dimensioned as an intervertebral insert, a long bone, a cranial bone, a bone of the pelvis, a bone of the hand, a bone of the foot or section of any of the foregoing.

115. (New) An osteoimplant which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through chemical linkages between their surface-exposed collagen, provided, that where substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, wherein the bone-derived elements are sheets obtained by longitudinally slicing

the diaphyseal region of whole cortical bone, and wherein the chemical linkages are formed by dehydrothermal treatment.

116. (New) The osteoimplant of Claim 115 wherein each sheet is approximately 1.5 mm thick.

117. (New) The osteoimplant of Claim 115 wherein the sheets are assembled into a layered structure prior to subjecting the sheets to dehydrothermal treatment.

118. (New) The osteoimplant of Claim 115 wherein at least one of the sheets possesses a fully or partially demineralized outer surface and a nondemineralized or partially demineralized core.

119. (New) The osteoimplant of Claim 115 wherein at least one of the sheets is fully demineralized.

120. (New) The osteoimplant of Claim 115 wherein at least one of the sheets is coated with demineralized bone powder.

121. (New) The osteoimplant of Claim 117 possessing a total thickness of from about 2 to about 20 mm.

122. (New) The osteoimplant of Claim 115 configured and dimensioned as a square or rectangle.

123. (New) The osteoimplant of Claim 115 configured and dimensioned as a cylinder.

124. (New) The osteoimplant of Claim 115 configured and dimensioned as an intervertebral insert, a long bone, a cranial bone, a bone of the pelvis, a bone of the hand, a bone of the foot or section of any of the foregoing.

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125. (New) An osteoimplant which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through chemical linkages between their surface-exposed collagen, provided, that where substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, wherein the bone-derived elements are sheets obtained by longitudinally slicing the diaphyseal region of whole cortical bone, and wherein the chemical linkages are formed by enzymatic treatment.

126. (New) The osteoimplant of Claim 125 wherein each sheet is approximately 1.5 mm thick.

127. (New) The osteoimplant of Claim 125 wherein the sheets are assembled into a layered structure prior to subjecting the sheets to enzymatic treatment.

128. (New) The osteoimplant of Claim 125 wherein at least one of the sheets possesses a fully or partially demineralized outer surface and a nondemineralized or partially demineralized core.

129. (New) The osteoimplant of Claim 125 wherein at least one of the sheets is fully demineralized.

130. (New) The osteoimplant of Claim 125 wherein at least one of the sheets is coated with demineralized bone powder.